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Certificate

REPUBLIC OF SOUTH AFRICA

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This is to certify that

The attached copy is a true and correct copy of a Provisional Patent Application filed at the South African Patent Office, of which application the details are as follows:

1.	Application No.:	2000/4456
2.	Filing date:	28 August 2000
3.	Title:	Trace Elements
4.	Inventor:	Robert Naylor LAURIE. Dr. Lambertus Petrus VOSLOO
5.	Applicant:	Animalia (Pty) Ltd

Geteken te PRETORIA in die Republiek van Suid-Afrika, hierdie 27 dag van August 2001
Signed at PRETORIA in the Republic of South Africa, this 27 day of August 2001

Registrateur van Patente
Registrar of Patents

FORM P1

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

PATENT APPLICATION AND ACKNOWLEDGEMENT

[Section 30(1) - Regulation 22]

The grant of a patent is hereby requested by the undermentioned applicant on the basis of the present application filed in duplicate.

21	01	Official Application No.: 20004456	DrG Ref.: 570014

71 **Full name(s) and address(es) of applicant(s):**

Animalia (Pty) Ltd
No. 2 Glendale Crescent
Newlands 7708

54 **Title of invention:**
TRACE ELEMENTS

The applicant claims priority as set out on the accompanying form P2. The earliest priority claimed is:

This application is for a patent of addition to Patent Application No.	21	01	
This application is a fresh application (section 37) based on Application No.	21	01	

THIS APPLICATION IS ACCOMPANIED BY THE FOLLOWING:

☒	1.	P6	Provisional specification	Pages: 8	
☐		P7	Complete specification	Pages:	2 copies
☐	2.		Drawings	Sheets:	
☐	3.	P8	Publication particulars and abstract in duplicate.		
☐	4.		Drawing for abstract		
☒	5.		An assignment of invention		
☐	6.		Certified priority document(s)		
☐	7.		Copy of Form P2 and SA Patent Application No	21 01	
☐	8.		Translation of the priority document(s)		
☐	9.		An assignment of priority rights		
☒	10.	P3	Declaration and power of attorney on form P3		
☐	11.	P4	Request for ante-dating on form P4		
☐	12.	P4	Request for classification on form P9		
☒	13.	P2	Register sheet (in duplicate)		

Date: 28 August 2000

DR GERNTHOLTZ
PATENT ATTORNEYS OF APPLICANT(S)

74 ADDRESS FOR SERVICE:
DR GERNTHOLTZ
PATENT AND TRADE MARK ATTORNEYS
P O BOX 8 CAPE TOWN 8000 SOUTH AFRICA
30 UNION ROAD MILNERTON 7441
TELEPHONE: +27 21 551 2650
TELEFAX: +27 21 551 2960

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FORM P2
(Lodge in Duplicate)

REPUBLIC OF SOUTH AFRICA — PATENTS ACT, 1978

REGISTER OF PATENTS

Official Application No.:	Lodging date: Provisional	Acceptance date:
21 01	22	47
International Classification:	**Lodging date: Complete**	**Grant date:**
51	22	

Full name(s) of applicant(s)/Patentee(s):

71 **Animalia (Pty) Ltd**

Applicants substituted	Date registered
71	

Assignee(s):	Date registered
71	

Full name(s) of inventor(s)

72 **Robert Naylor LAURIE**
Dr. Lambertus Petrus VOSLOO

Priority claimed	Country	Number	Date
N.B. Use international abbreviation for country (see schedule 4)	33	31	32

Title of invention

54 **TRACE ELEMENTS**

Address of applicant(s)/patentee(s)

No. 2 Glendale Crescent
Newlands 7708

Address for service **Dr GERNTHOLTZ** **(DrG Ref: 570014)**

74

30 UNION ROAD
MILNERTON / CAPE
7441

P O BOX 8
CAPE TOWN
8000

TEL: (021) 551 2650
FAX: (021) 551 2960 / 551 2974
E-MAIL: gerpat@iafrica.com

Patent of addition No.	Date of any change
74	
Fresh application based on	Date of any change

FORM P6

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

PROVISIONAL SPECIFICATION

[Section 30(1) - Regulation 27]

21	01	**Official Application No.:**	**DrG Ref.:** 570014
22		**Lodging date:**	
71		**Full name(s) of applicant(s):** Animalia (Pty) Ltd	
72		**Full name(s) of inventor(s)** Robert Naylor LAURIE Dr. Lambertus Petrus VOSLOO	
54		**Title of invention** TRACE ELEMENTS	

ADDRESS FOR SERVICE:
DR GERNTHOLTZ
PATENT AND TRADE MARK ATTORNEYS
P O BOX 8 CAPE TOWN 8000 SOUTH AFRICA
30 UNION ROAD MILNERTON 7441
TELEPHONE: +27 21 551 2650
TELEFAX: +27 21 551 2960

DrG REF: 570014discussion

TITLE OF INVENTION

Trace elements.

FIELD OF INVENTION

The present invention relates to trace elements.

BACKGROUND TO INVENTION

It has been found that there is a deficiency of certain trace elements in pastures for livestock in particular areas in South Africa and also in other countries. Various suggestions have been made to provide the required trace elements to such animals. Different chemical compounds and complexes have been investigated for applying the trace elements by way of licks, drenches or injections.

In general the problem with injectable solutions is that there are too low concentrations of the minerals in the solutions. This means that relatively large quantities have to be injected, which in turn cause tissue damage and also abscesses at the site of injection. Furthermore, it is generally the case that different trace elements seldomly are individually sufficient. This means that two or more trace element solutions have to be provided by way of separate injections.

US 4,335,116 (Howard) discloses mineral-containing therapeutic compositions containing EDTA complexes of trace elements. Notably, US 4,335,116 utilises tetra-sodium EDTA, a selenium glycine complex, and metal chlorides for the preparation of the EDTA complexes. Unfortunately, the chloride ions cause contamination and each complex solution is to be made individually. Furthermore, overnight time is required for complexing and heating up afterward to speed up the process requires extra apparatus.

If mixtures are required, the individual solutions are to be blended. If various concentrations as well as compositions are to be made, it can only be done in a cumbersome way, requiring extra apparatus. A further problem may arise when mixtures of high concentration are needed. In certain cases it would be impossible to deliver them, because mixing is always accompanied by dilution.

It is an object of the invention to suggest methods and means for overcoming these problems.

In the specification and claims the expression EDTA refers to ethylene diaminotetraacetic acid ($C_{10}H_{16}O_8N_2$ or $(HO_2CH_2C)_2NCH_2CH_2N\text{-}(CH_2CO_2H)_2$).

SUMMARY OF INVENTION

According to the invention, a method of preparing a trace element solution includes the steps

(a) of providing at least one EDTA-complex;

(b) of providing a sodium selenite solution; and

(c) of combining the EDTA-complex(es) and the sodium selenite solution.

If more than one EDTA-complex is used, these EDTA-complexes may be prepared in a single continuous process.

The EDTA-complex(es) may be prepared by using disodium EDTA or EDTA acid.

The EDTA-complex(es) may be prepared by using metal oxides, metal hydroxides or metal carbonates.

The EDTA-complex(es) may include at least one of the metal compounds selected from the group consisting of copper, manganese, zinc, molybdenum and chromium.

A trace element solution as prepared by a method as set out herein.

Also, according to the invention, a trace element solution includes

(a) at least one EDTA complex prepared by using disodium EDTA or EDTA acid;

(b) selenium; and

(c) any other suitable mineral.

The solution may be an injectable solution.

The solution may be a drenchable solution.

Further according to the invention a stock lick includes

(a) at least one EDTA complex prepared by using disodium EDTA or EDTA acid;

(b) selenium; and

(c) any other suitable mineral.

Also, according to the invention, a method of providing trace elements to animals, such as livestock includes the steps of preparing a trace element solution set out herein and of providing the solution in a suitable quantity to an animal.

DESCRIPTION OF EXAMPLES

The invention will now be described by way of example of injectable solutions in accordance with the invention.

EXAMPLE 1

DI-SODIUM ZINC ETHYLENE DIAMINO TETRA ACETATE ($C_{10}H_{12}O_8N_2ZnNa_2$) IN WATER SOLUTION.

EDTA is suspended in a quantity of distilled water at 50°C and is stirred continuously. In small proportions firstly sodium hydroxide (NaOH) and then zinc oxide (ZnO) are added in sequence. The pH of the clear solution obtained is measured and brought to 7, if necessary, by either the addition of NaOH (if acid) or EDTA (if alkaline). More distilled water is added to bring the zinc concentration to a predetermined level, and the solution is subsequently filtered.

If 25,16g zinc oxide, 90,37g EDTA and 24,74g NaOH are used and the total volume is 1 litre, the zinc concentration in the solution will be 20mg/ml.

EXAMPLE 2

DI-SODIUM MANGANESE ETHYLENE DIAMINO TETRA ACETATE ($C_{10}H_{12}O_8N_2MnNa_2$) IN WATER SOLUTION

The same method as under example 1 is used with the following variation:

Manganese carbonate ($MnCO_3.xH_2O$) is used in place of zinc oxide.

If 45,45g manganese carbonate, 106,39g EDTA and 29,12g NaOH are used, and the total volume is 1 litre, the manganese concentration will be 20mg/ml.

EXAMPLE 3

DI-SODIUM COPPER ETHYLENE DIAMINO TETRA ACETATE ($C_{10}H_{12}O_8N_2CuNa_2$) IN WATER SOLUTION

The same method as under Example 1 is followed but with the following variation:

Basic copper carbonate ($CuCO_3Cu(OH)_2$. H_2O) is used in place of the zinc oxide.

If 18,81g basic copper carbonate, 45,99g EDTA and 12,59g NaOH are used, and the total volume is 1 litre, then the copper concentration in the solution will be 10mg/ml.

EXAMPLE 4

MONO-SODIUM CHROMIUM DIAMINO TETRA ACETATE ($C_{10}H_{12}O_8N_2CrNa$) IN WATER SOLUTION

The same method as under Example 1 is followed, but with the following variation:

Chromium tri-chloride hexahydrate ($CrCl_3.6H_2O$) is used in the place of zinc oxide.

If 25,62g chromium tri-chloride hexahydrate, 31,59g EDTA and 15,38g sodium hydroxide are used and the total is 1 litre, the chromium concentration in the solution will be 5mg/ml.

EXAMPLE 5

SODIUM SELENITE ($Na_2SeO_3.H_2O$) SOLUTION IN WATER

If 12,09g sodium selenite is used and the total volume is 1 litre, the selenium concentration in the solution will be 5mg/ml.

EXAMPLE 6

A MIXTURE OF THE COMPOUNDS OF EXAMPLES 1 TO 5

The method is a combination of the above methods under Examples 1,2,3, 4 and 5 and takes place as follows:

1. The zinc preparation as per Example 1 is prepared.
2. To this added (in the same container) the chemicals as used for Example 2 for the preparation of the manganese compound.
3. Then the chemicals used as under Example 3 for the preparation of the copper compound are added.
4. At this stage the pH is brought to 7 as described under Example 1 above.
5. Subsequently the chemicals used as under Example 4 for the preparation of the chromium compound are added.
6. Lastly the chemicals used as under Example 5 are added.
7. Finally the total volume is adapted by the addition of distilled water.
8. Filtration takes place.

If 25,16g zinc oxide, 45,45g manganese carbonate, 18,81g basic copper carbonate, 25,62g chromium tri-chloride hexahydrate, 12,09g sodium selenite, 274,34g EDTA and 81,83g NaOH are used, and if the total volume

is 1 litre, then the zinc concentration will be 20mg/ml, the manganese concentration 20mg/ml, copper concentration 10mg/ml, the chromium concentration 5mg/ml and the selenium concentration 5mg/ml.

EXAMPLE 7

TETRA SODIUM MOLYBDENUM TRI-OXIDE ETHYLENE DIAMINO TETRA ACETATE ($C_{10}H_{12}O_8N_2MoO_3Na_4$) IN WATER SOLUTION

Molybdenum tri-oxide (MoO_3) is suspended at room temperature in a quantity of water and stirred continuously. In portions in sequence firstly sodium hydroxide (NaOH) and then EDTA are added. The pH of the clear solution obtained is measured and it is brought to 7 if required, by adding either NaOH (if acid) or EDTA (if alkaline). More distilled water is added to bring the molybdenum concentration to a pre-determined value. The pH is changed to 6 by the addition of concentrated HCl. Filtration takes place.

If 60,02g MoO_3, 66,71g NaOH and 121,84g EDTA are used and if the volume is 1 litre, then the molybdenum concentration will be 40mg/ml.

In all of the above examples the order of mixing the chemicals may be changed to some extent without any influence on the products formed.

All of the above products can be obtained as solids by evaporation of the appropriate solutions.

All of the above-mentioned chemicals may be substituted by others, provided the substitute are used in equivalent quantities. The particulars are as follows:

1. The di-sodium salt of EDTA in place of EDTA acid.

2. Basic zinc carbonate ($2ZnCO_3.3Zn(OH)_2$) or zinc hydroxide ($Zn(OH)_2$) in place of zinc oxide.

3. Manganese hydroxide ($Mn(OH)_2$) in place of manganese carbonate.

4. Cupric hydroxide ($Cu(OH)_2$) or cupric oxide (CuO) in place of basic copper carbonate.

5. Anhydrous chromium tri-chloride ($CrCl_3$) in place of chromium tri-chloride hexahydrate.

6. Sodium molybdate (Na_2MoO_4) in place of molybdenum tri-oxide.

PATENT CLAIMS

1. A method of preparing a trace element solution, which includes the steps

(a) of providing at least one EDTA-complex;

(b) of providing a sodium selenite solution; and

(c) of combining the EDTA-complex(es) and the sodium selenite solution.

2. A method as claimed in claim 1, in which more than one EDTA-complex is used and in which these EDTA-complexes are prepared in a single continuous process.

3. A method as claimed in claim 1 or claim 2, in which the EDTA-complex(es) is(are) prepared by using disodium EDTA or EDTA acid.

4. A method as claimed in any one of the preceding claims, in which the EDTA-complex(es) are prepared by using metal oxides, metal hydroxides or metal carbonates.

5. A method as claimed in any one of the preceding claims, in which the EDTA-complex(es) include(s) at least one of the metal compounds

selected from the group consisting of copper, manganese, zinc, molybdenum and chromium.

6. A method of preparing a trace element solution substantially as hereinbefore described.

7. A trace element solution as prepared by a method as claimed in any one of claims 1 to 6.

8. A trace element solution, which includes

(a) at least one EDTA complex prepared by using disodium EDTA or EDTA acid;

(b) selenium; and

(c) any other suitable mineral.

9. A solution as claimed in claim 7 or claim 8, which is an injectable solution.

10. A solution as claimed in claim 7 or claim 8, which is a drenchable solution.

11. A trace element solution substantially as hereinbefore described.

12. A stock lick, which includes

(a) at least one EDTA complex prepared by using disodium EDTA or EDTA acid ;

(b) selenium; and

(c) any other suitable mineral.

13. A stock lick substantially as hereinbefore described.

14. A method of providing trace elements to animals, such as livestock, which includes the steps of preparing a trace element solution as claimed in any one of claims 1 to 5, and of providing the solution in a suitable quantity to an animal.

15. A method of providing trace elements to animals substantially as hereinbefore described.

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DR R O P GERNTHOLTZ
DR GERNTHOLTZ
Patent Attorneys of Applicants
P O Box 8
CAPE TOWN 8000
30 Union Road
MILNERTON/CAPE 7441
SOUTH AFRICA
Tel: (021) 5512650
Fax: (021) 5512960
DrG Ref.: 570014

570014discussion